

ABSTRACT

An undulator comprises a first magnetic circuit (11) for forming a periodic magnetic field, a first support body (21) for supporting the first magnetic circuit (11), a second magnetic circuit (12) arranged opposite to the first magnetic circuit (11), for  
5 forming a periodic magnetic field, a second support body (22) for supporting the second magnetic circuit (12), a space (13) formed between the oppositely arranged first magnetic circuit (11) and the second magnetic circuit (12), for passing an electron beam, a vacuum chamber (1) for vacuum-sealing the first magnetic circuit (11) and the second magnetic circuit (12), and a refrigerant passing tube (30) for cooling a  
10 permanent magnet (m) constituting the first magnetic circuit (11) and the second magnetic circuit (12) below the room temperature.